

Merging Black Holes

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The final merger of two black holes is expected to be the strongest source of gravitational waves for both ground-based detectors such as LIGO and VIRGO, as well as future space-based detectors.

Since the merger takes place in the regime of strong dynamical gravity, computing the resulting gravitational waveforms requires solving the full Einstein equations of general relativity on a computer. For many years, numerical codes designed to simulate black hole mergers were plagued by a host of instabilities. However, recent breakthroughs have conquered these instabilities and opened up this field dramatically. This talk will focus on the resulting 'gold rush' of new results that is revealing the dynamics and waveforms of binary black hole mergers, and their applications in gravitational wave detection, testing general relativity, and astrophysics.